

# PATENT ABSTRACTS OF JAPAN

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(54) ADHESIVE FOR ADHERING NEWLY PLACED CONCRETE TO EXISTING CONCRETE

(57)Abstract:

PROBLEM TO BE SOLVED: To provide an adhesive for adhering newly placed concrete to existing concrete, capable of curing at such a low temperature as 5°C, having an appropriate useful service time, having a low viscosity, therefore excellent in workability and adhesiveness, and further scarcely causing safety problems such as air pollution, because of not using any solvent.

SOLUTION: This adhesive for adhering newly placed concrete to existing concrete is obtained by using an epoxy resin composition comprising a specific heterocyclic ring-containing compound, a polyepoxy compound, and an amino compound having two or more active hydrogen atoms derived from amino groups in a molecule.

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 IN Ando, Takeshi; Adachi, Taki  
 PA Sanyo Chemical Industries Ltd., Japan  
 SO Jpn. Kokai Tokkyo Koho, 12 pp.  
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 LA Japanese  
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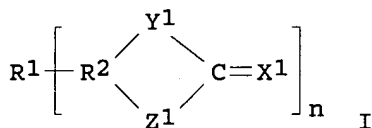
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CLASS

PATENT NO.	CLASS	PATENT FAMILY CLASSIFICATION CODES
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AB The adhesives contain (A) heterocyclic compds. I (n = 1-10 integer; X1, Y1, Z1 = O, S; R1 = H, residues of cyclic ether-bearing compds.; R2 = C2-10 hydrocarbon), (B) polyepoxides, and (C) compds. bearing ≥2 amino-derived active H. Thus, an adhesive composed of a heterocyclic compound prepared from CS2 and 2-ethylhexyl glycidyl ether 30, m-xylylenediamine 35, and Epikote 828 190 parts showed viscosity 6400 mPas and peeling strength 25 kg/cm2 against a portland cement plate for pavement.

ST concrete joining reactive adhesive heterocyclic compd; polyepoxide xylylenamine reactive adhesive concrete joining; pot life curability balanced reactive adhesive; solventless adhesive polyepoxide reactive heterocycle contg

IT Concrete  
 (new and old, joining of; solvent-free adhesives with long pot life and low viscosity for joining of new and old concrete materials)

IT Cement (construction material)  
 (portland, for pavements; solvent-free adhesives with long pot life and low viscosity for joining of new and old concrete materials)

IT Adhesives  
 (reactive, solventless; solvent-free adhesives with long pot life and low viscosity for joining of new and old concrete materials)

IT Epoxy resins, uses

RL: IMF (Industrial manufacture); PRP (Properties); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)

(solvent-free adhesives with long pot life and low viscosity for joining of new and old concrete materials)

IT Adhesives

(solventless, reactive; solvent-free adhesives with long pot life and low viscosity for joining of new and old concrete materials)

IT 90-72-2, DMP 30

RL: CAT (Catalyst use); USES (Uses)

(curing accelerators; solvent-free adhesives with long pot life and low viscosity for joining of new and old concrete materials)

IT 75-15-0, Carbon disulfide, reactions 503-30-0, Trimethylene oxide  
2461-15-6, 2-Ethylhexyl glycidyl ether 3454-29-3, Trimethylolpropane  
triglycidyl ether

RL: RCT (Reactant); RACT (Reactant or reagent)

(in preparation of heterocyclic compds. reactive with polyepoxides and with active-H-bearing compds. for adhesives)

IT 34057-38-0P, 1,3-Oxathiane-2-thione 203722-96-7P 306769-82-4P

RL: IMF (Industrial manufacture); POF (Polymer in formulation); PRP (Properties); RCT (Reactant); TEM (Technical or engineered material use);  
PREP (Preparation); RACT (Reactant or reagent); USES (Uses)

(solvent-free adhesives with long pot life and low viscosity for joining of new and old concrete materials)

IT 1477-55-0, m-Xylylenediamine 25068-38-6, Epikote 828

RL: POF (Polymer in formulation); PRP (Properties); RCT (Reactant); TEM (Technical or engineered material use); RACT (Reactant or reagent); USES (Uses)

(solvent-free adhesives with long pot life and low viscosity for joining of new and old concrete materials)

DERWENT-ACC-NO: 2002-143153

DERWENT-WEEK: 200225

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TITLE: Adhesives, used for oldnew concrete placing joints, comprises heterocyclecontaining compound, polyepoxy compound and an amino compound bearing at least two active hydrogens

PATENT-ASSIGNEE: SANYO CHEM IND LTD[SANN]

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INT-CL (IPC): C08G059/56, C09J163/00 ; E04G021/02

ABSTRACTED-PUB-NO: JP2001240837A

BASIC-ABSTRACT:

NOVELTY - Adhesive for old-new concrete placing joints comprises: (A) a heterocycle-containing compound (I); (B) a polyepoxy compound bearing at least two epoxy groups in the molecule; and (C) an amino compound bearing at least two active hydrogens derived from an amino group in the molecule.

DETAILED DESCRIPTION - An adhesive for old-new concrete placing joints comprises:

- (A) a heterocycle-containing compound of formula (I);
- (B) a polyepoxy compound bearing at least two epoxy groups in the molecule; and
- (C) an amino compound bearing at least two active hydrogens derived from an amino group in the molecule.

An INDEPENDENT CLAIM is also included for cured products obtained by curing the adhesives.

n = 1-10;

X1, Y1, Z1 = O or S;

R1 = residue of (D) a compound bearing a cyclic ether group or H; and

R2 = 2-10C hydrocarbon.

USE - The adhesives for old-new concrete placing joints are useful for concrete, glass, metal and wood and thus for oldnew concrete joints, anchor bolts placing, repairs of cracks and lifting of concrete, protective coats for concrete floors and adhesion of tiles.

ADVANTAGE - The adhesives for old-new concrete placing joints can cured at a low temperature of 5 deg. C and have an appropriate pot life, a low viscosity and thus excellent workability, excellent adhesion properties and few safety problems such as air pollution because of no use of organic solvents and the

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1. This document has been translated by computer. So the translation may not reflect the original precisely.
2. \*\*\*\* shows the word which can not be translated.
3. In the drawings, any words are not translated.

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DETAILED DESCRIPTION

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## [Detailed Description of the Invention]

[0001]

[The technical field to which invention belongs] This invention relates to the adhesives of a reaction type. It is related with the adhesives for old and new concreting splices excellent in the adhesive property which consists of still more detailed new epoxy system resin.

[0002]

[Description of the Prior Art] The method of construction with which an epoxy resin slushes [ since the hardened material which was tough when alkali resistance blended good and suitable a curing agent and a modifier, and had flexibility is obtained and wetting with concrete is moreover good ] new concrete before hardening it after applying epoxy resin adhesive to the old concrete side in order to secure the adhesive property of an interface when striking and inheriting new concrete to the old concrete and producing a concrete building is taken.

## [Problem(s) to be Solved by the Invention]

[0003] However, low temperature and in order that [ if it became especially 5 degrees C or less, ] an epoxy resin might not harden, the cure of heating in a construction site was required of the adhesives of an epoxy resin system. Moreover, although there was much what uses an volatile organic solvent at conventional epoxy resin adhesive, adhesives which do not use such a solvent taken up for an air pollution problem today are desired.

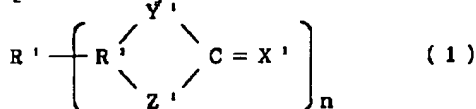
[0004] This invention can solve these problems, and can harden them also at low temperature like 5 degrees C, and it has moderate working life, and workability is good at hypoviscosity, it is a non-organic solvent system, and the adhesives for old and new concreting splices which were further excellent in the adhesive property are offered.

[0005]

[Means for Solving the Problem] this invention persons reached this invention, as a result of repeating examination wholeheartedly that the above-mentioned purpose should be attained. That is, this invention is adhesives for old and new concreting splices characterized by consisting of the heterocycle content compound (A) expressed with the following general formula (1), a Pori epoxy compound (B) which has two or more epoxy groups in a molecule, and an amino compound (C) which has two or more active hydrogen which originates in the amino group in a molecule at a list.

[0006]

[Formula 5]

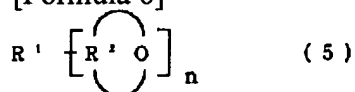


[0007] [-- for n, as for oxygen or sulfur atom; R1, the integer of 1-10, and X1, Y1 and Z1 are [ the residue of a cyclic ether radical content compound (D) or hydrogen atom; R2 ] the hydrocarbon group of carbon numbers 2-10 independently among a formula (1), respectively.]

[0008]

[Embodiment of the Invention] A heterocycle content compound (A) is shown by said general formula (1) in this invention. the inside of a formula, and n -- the integer of 1-10 -- it is the integer of 2-8 preferably. X1, Y1, and Z1 are oxygen or a sulfur atom, respectively. X1 is a sulfur atom (S) preferably, and one side of Y1 and Z1 is [ another side ] an oxygen atom (O) by the sulfur atom (S). R2 It is the residue which constitutes rings other than the oxygen atom in a cyclic ether radical. This is the hydrocarbon group of carbon numbers 2-10, and it is the radical shown by trivalent hydrocarbon-group >CH(CH2) m- (m is the integer of 1-9). For example, >CHCH2-, >CHCH2CH2-, >CHCH2CH2CH2-, It is the radical shown.,, such as >CHCH2CH2CH2CH2CH2-, -- tetravalent hydrocarbon-group >CH(CH2) mCH -- < (m is the integer of 0-8) -- for example, >CHCH -- < -- >CHCH2CH -- < -- >CHCH2CH2CH -- < -- >CHCH2CH2CH2CH2CH< etc. is mentioned, it is a desirable trivalent hydrocarbon group, and they are >CHCH2- and >CHCH2CH2- especially preferably. R1 is the residue of a hydrogen atom or a cyclic ether radical content compound (D), and is shown by the general formula (5). General formula [0009]

[Formula 6]



[00010] The compound which will not be limited as a cyclic ether radical especially if it has one or more oxygen atoms in endocyclic, for example, has 1-10 cyclic ether radicals in intramolecular is raised. As an example of a cyclic ether radical content compound (D), the epoxy group content compound (D1) mentioned later, an oxetane compound (D2), etc. are mentioned, and it is an epoxy group content compound (D1) preferably. As an epoxy group content compound (D1), there are mono-epoxide (d11) and poly epoxide (D11) which has two or more epoxy groups in a molecule. As mono-epoxide (d11), especially if it has one epoxy group in the molecule, it will not be limited, but according to an application and the purpose, it can choose suitably. The following are mentioned as the example. for example, the hydrocarbon system oxide (ethylene oxide --) of carbon numbers (d11-1) 2-24 Propylene oxide, 1-butene oxide, 2-butene oxide, alpha-olefin oxide of carbon numbers 5-24, the glycidyl ether (n-butyl glycidyl ether --) of the hydrocarbon of the carbon numbers (d11-2) 3-19, such as styrene oxide Allyl glycidyl ether, 2-ethyl-hexyl glycidyl ether, 2-methyl octyl glycidyl ether, phenyl glycidyl ether, Cresyl glycidyl ether, p-sec-buthylphenyl glycidyl ether, the glycidyl ester (glycidyl acrylate --) of the monocarboxylic acid of carbon numbers (d11-3) 3-30, such as p-tert-buthylphenyl glycidyl ether Hydroxyl-group content oxide, such as epihalohydrin, such as epichlorohydrin, such as glycidyl methacrylate, and epibromohydrin, and glycidol, etc. is mentioned. The glycidyl ether of the hydrocarbon of the hydrocarbon system oxide of carbon numbers 2-24 and carbon numbers 3-19 is desirable.

[0011] Especially if poly epoxide (D11) has two or more epoxy groups in the molecule, it will not be limited, but it can be suitably chosen according to an application and the purpose. It has 2-6 epoxy groups in a molecule preferably. The weight per epoxy equivalent (molecular weight per epoxy group) of poly epoxide is usually 65-1000, and is 90-500 preferably. The adhesives of this invention are reaction types over which (A) - (C) constructs a bridge as weight per epoxy equivalent is 1000 or less, the structure of cross linkage does not become loose, but physical properties, such as the water resisting property of the hardened material which constructed the bridge, chemical resistance, and a mechanical strength, are good, and, on the other hand, the water resisting property of a hardened material, chemical resistance, a mechanical strength, etc. become that weight per epoxy equivalent is 65 or more with the good structure of cross linkage. As an example of poly epoxide (D11), (D 11-5) is mentioned from the following (D 11-1).

[0012] (D 11-1) the diglycidyl ether of the dihydric phenol of the diglycidyl ether carbon numbers 6-30 of glycidyl ether (mold i) dihydric phenol -- for example Bisphenol F diglycidyl ether, bisphenol A diglycidyl ether, Bisphenol B diglycidyl ether, bisphenol A D diglycidyl ether, Bisphenol S diglycidyl

ether, halogenation bisphenol A diglycidyl ether, Tetra-chloro bisphenol A diglycidyl ether, catechin diglycidyl ether, Resorcinol diglycidyl ether, hydroquinone diglycidyl ether, 1, 5-dihydroxy naphthalene diglycidyl ether, dihydroxybiphenyl diglycidyl ether, OKUTA chloro -4, 4'-dihydroxybiphenyl diglycidyl ether, Tetramethyl biphenyl diglycidyl ether, 9, and 9'-bis(4-hydroxyphenyl) Flo Orange glycidyl ether, the diglycidyl ether obtained from the reaction of two mols of bisphenol A and three mols of epichlorohydrin are mentioned.

[0013] (ii) by the poly glycidyl ether carbon numbers 6-50 of polyhydric phenols beyond trivalent - 6 \*\*, or it, or more than it the poly glycidyl ether of trivalent [ of molecular weight 250-5000 ] - 6 \*\*, or the polyhydric phenols beyond it -- for example Pyrogallol triglycidyl ether, dihydroxy naphthyl cresol triglycidyl ether, Tris (hydroxyphenyl) methane triglycidyl ether, dinaphthyl triol triglycidyl ether, Tetrakis (4-hydroxyphenyl) ethane tetraglycidyl ether, Tris methyl-tert-butyl-butyl hydroxy methane triglycidyl ether, 4 and 4'-oxy-bis(1, 4-phenylethyl) tetra-cresol glycidyl ether, 4 and 4'-oxy-bis(1, 4-phenylethyl) phenyl glycidyl ether, Bis(dihydroxy naphthalene) tetraglycidyl ether, a phenol, or the glycidyl ether of cresol novolak resin (molecular weight 400-5000), The glycidyl ether of limonene phenol novolak resin (molecular weight 400-5000), The poly glycidyl ether of the polyphenol (molecular weight 400-5000) therefore obtained by the condensation reaction of a phenol, glyoxal, a glutaraldehyde, or formaldehyde, And the poly glycidyl ether of the polyphenol of the molecular weight 400-5000 obtained by the condensation reaction of resorcinol and an acetone etc. is mentioned.

[0014] (iii) the diglycidyl ether of the diglycidyl ether carbon numbers 2-100 of aliphatic series dihydric alcohol, and the diol of molecular weight 150-5000 -- for example Ethylene glycol diglycidyl ether, propylene glycol diglycidyl ether, Tetramethylene glycol diglycidyl ether, 1, 6-hexanediol diglycidyl ether, Polyethylene-glycol (molecular weight 150-4000) diglycidyl ether, Polypropylene-glycol (molecular weight 180-5000) diglycidyl ether, Polytetramethylene glycol (molecular weight 200-5000) diglycidyl ether, Neopentyl glycol diglycidyl ether, the diglycidyl ether of the alkylene oxide [ethylene oxide or propylene oxide (1-20 mols)] addition product of bisphenol A, etc. are mentioned.

(iv) The glycidyl ether of trivalent [ of molecular weight 92-10000 ] - 6 \*\*, or the polyhydric alcohol beyond it, for example, trimethylolpropane triglycidyl ether, glycerol triglycidyl ether, pentaerythritol tetraglycidyl ether, sorbitol hexa glycidyl ether, Pori (n=2-5) glycerol polyglycidyl ether, etc. are mentioned by trivalent - 6 \*\*, the poly glycidyl ether carbon numbers 3-50 of the fatty alcohol beyond it, or more than it.

[0015] (D 11-2) The glycidyl ester of divalent - 6 \*\*, the aliphatic series beyond it, or alicyclic polycarboxylic acid is mentioned at divalent - 6 \*\* or the glycidyl ester of the aromatic polycarboxylic acids beyond it and carbon numbers 6-20, or more than it by the glycidyl ester mold carbon numbers 6-20 or more than it.

(i) As glycidyl ester of aromatic polycarboxylic acids, for example, phthalic acids, they are phthalic-acid diglycidyl ester, isophthalic acid diglycidyl ester, terephthalic-acid diglycidyl ester, trimellitic acid triglycidyl ester, etc.;

(ii) As glycidyl ester of aliphatic series or alicyclic polycarboxylic acid, the polymer (\*\*) (a degree of polymerization is 2-10) of the nucleus water additive of the glycidyl ester of the above-mentioned phenol system, dimer acid diglycidyl ester, a diglycidyl OKISA rate, diglycidyl malate, diglycidyl succinate, a diglycidyl GURUTA rate, a diglycidyl horse mackerel peat, diglycidyl PIMERETO, and glycidyl (meta) acrylate, tricarballic acid triglycidyl ester, etc. are mentioned.

[0016] (D 11-3) The glycidyl amine of the glycidyl amine of aromatic amine with 2-10, or the active hydrogen atom beyond it and aliphatic series, alicyclic, or heterocyclic amine is mentioned by the glycidyl amine mold carbon numbers 6-20 or more than it.

(i) -- as the glycidyl amine of aromatic amine -- N and N-diglycidyl aniline, N, and N-diglycidyl toluidine, N and N, N', and N --, such as - tetraglycidyl ether diamino diphenylmethane, N, N, N', and N'- tetraglycidyl ether diaminodiphenyl sulfone, N and N, N', N'-tetraglycidyl ether diethyl diphenylmethane, N and N, and O-triglycidyl aminophenol

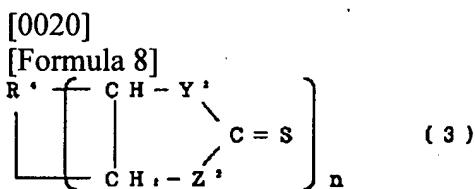
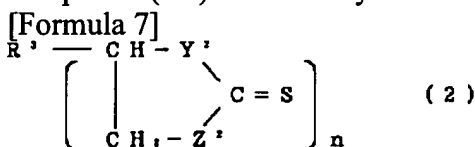
(ii) As a glycidyl amine of fatty amines, they are N, N, N', an N'- tetraglycidyl ether xylylene diamine, N and N, N', N'-tetraglycidyl ether hexamethylenediamine, etc.;

(iii) As a glycidyl amine of alicyclic amines, N, N, N', the hydrogenation compound of N'-tetraglycidyl ether xylylene diamine, etc. are mentioned. A tris glycidyl melamine etc. is mentioned as a glycidyl amine of heterocyclic amine.

[0017] (D 11-4) 2 - 6 \*\* or the chain-like aliphatic series epoxide beyond it, for example, the epoxidation polybutadiene of weight per epoxy equivalent 130-1,000, (molecular weight 90-2,500), epoxidized soybean oil (molecular weight 130-2,500), etc. are mentioned by the chain-like aliphatic series epoxide carbon numbers 6-50 or more than it.

(D 11-5) the alicyclic epoxide carbon numbers 6-50 or more than it -- the alicyclic epoxide beyond several 1-4 or it of molecular weight 90-2500 and an epoxy group -- for example Vinylcyclohexene dioxide, limonene dioxide, dicyclopentadiene dioxide, The bis(2, 3-epoxy cyclopentyl) ether, the ethylene glycol BISUEPOKISHIJI cyclopentyl ether, 3 and 4 epoxy-6-methylcyclohexyl methyl 3', 4' - epoxy -6'-methylcyclohexane carboxylate, A bis(3, 4-epoxy-6-methylcyclohexyl methyl) horse mackerel peat, a bis(3, 4-epoxy-6-methylcyclohexyl methyl) butylamine, etc. are mentioned. Moreover, the nucleus hydrogenation ghost of the epoxy compound of said phenols is also included. In addition (D 11-1), if things other than - (D 11-5) are also active hydrogen and an epoxy resin with the glycidyl group in which a reaction is possible, they can be used. Moreover, two or more sorts of these Pori epoxy compounds can be used together. A glycidyl ether mold (D 11-1) and a glycidyl ester mold (D 11-2) are [ among these ] desirable, and especially a desirable thing is a glycidyl ether mold (D 11-1). The diglycidyl ether of dihydric phenol and divalent fatty alcohol is desirable among (D 11-1).

[0018] As an oxetane compound (D2), the aliphatic series system oxetane compound of carbon numbers 6-20 (3-ethyl-3-hydroxymethyloxetane etc.), the aromatic series system oxetane compound (benzyl oxetane --) of carbon numbers 7-30 The aliphatic-carboxylic-acid system oxetane compound of the carbon numbers 6-30, such as xylylene bisoxetane, (horse mackerel peat bisoxetane etc.), The aromatic-carboxylic-acid system oxetane compound of carbon numbers 8-30 (terephthalate bisoxetane etc.), The alicyclic carboxylic-acid system oxetane compound of carbon numbers 8-30 (cyclohexane dicarboxylic acid bisoxetane etc.), Aromatic series isocyanate system oxetane compounds (MDI bisoxetane etc.), the sulfur system oxetane compounds (thiirane, 2-methyl thiirane, 2, and 2-dimethyl thiirane, 2-hexyl thiirane, 2-phenyl thiirane, etc.) of carbon numbers 2-20, etc. are mentioned. As a cyclic ether radical content compound (D), the heterocycle content compound (A1) which used the epoxy group content compound (D1) is shown by the following general formula (2) and (3). General formula [0019]



[0021] The inside of [type and n are the integer of 1-10. As for Y2 and Z2, one side is [ another side ] O in S, preferably, Y2 is O and Z2 is S. R3 is the residue of the Pori epoxy compound (D11) or a mono-epoxy compound (d11). R4 is the residue of alicyclic epoxide. n is the residue O and Z2 are excluding S and excluding [ R3 ] the epoxy group of a monoglycidyl compound (d11-2) in 1 and Y2, especially preferably here.]

[0022] Although especially the manufacture approach of the heterocycle content compound (A) of this invention is not limited, it is obtained by making one sort or two sorts or more of compounds chosen from the group which consists of the carbon disulfide, carbonyl sulfide, and carbon dioxide of the equivalent 0.5 - 10 times, for example to the cyclic ether radical of a cyclic ether radical content



compound (D) react under the catalyst existence in a solvent. It is a carbon disulfide preferably. If a reaction is not checked but a raw material and a product are dissolved as a solvent, there is especially no limit and an aprotic solvent is usually used. For example, ether (a tetrahydrofuran, dioxane, diethyl cellosolve, dioxolane, a trioxane, dibutyl cellosolve, a diethyl kaavie toll, dibutyl kaavie toll, etc.), ketones, ester (an acetone, a methyl ethyl ketone, methyl isobutyl ketone, diethyl ketone, etc.) (methyl acetate, ethyl acetate, n-butyl acetate, etc.), other polar solvents (an acetonitrile, dimethylformamide, N-methyl pyrrolidone, dimethyl sulfoxide, etc.), etc. are mentioned, and they are a tetrahydrofuran, an acetone, ethyl acetate, etc. preferably. It is the halogenide of alkali metal or an alkaline earth metal, for example, a lithium chloride, a lithium bromide, a lithium iodide, potassium chloride, a calcium bromide, etc. are mentioned, and a catalyst is a lithium bromide preferably. The amount of a catalyst is the 0.001 - 1.0 time equivalent to the cyclic ether radical of (D). It is the 0.01 to 0.1 time equivalent preferably. [0023] 0-100 degrees C of reaction temperature are usually 20-70 degrees C preferably. The weight average molecular weight of the heterocycle content compound (A) manufactured as aforementioned is 120-12,000, and is 200-8,000 preferably. The heterocycle equivalents are usually 120-1,200, and are 200-800 preferably. It is usually 20 or less Pa-s, and preferably, 10 or less Pa-s, the viscosity in 25 degrees C is 5 or less Pa-s still more preferably, and is 1 or less Pa-s especially preferably. What specifically indicated the heterocycle content compound (A) obtained as mentioned above to Table 1 is mentioned.

[0024]

[Table 1]

No.	R <sub>1</sub>	R <sub>2</sub>	X	Y	Z
1	メチル基	>CHCH <sub>2</sub> -	S	O	S
2	メチルフェニル基、メチルベンジル基、メチルシロキシル基を除いたメチル基	>CHCH <sub>2</sub> -	S	O	S
3	水素	>CHCH <sub>2</sub> CH <sub>2</sub> -	S	O	S
4	メチルフェニル基、メチルベンジル基を除いたメチル基	>CHCH <sub>2</sub> -	S	O	S
5	メチルフェニル基、メチルベンジル基を除いたメチル基	>CHCH <sub>2</sub> -	S	O	S
6	メチルフェニル基、メチルベンジル基を除いたメチル基	>CHCH <sub>2</sub> -	S	O	S
7	メチルフェニル基、メチルベンジル基を除いたメチル基	>CHCH <sub>2</sub> -	S	O	S
8	メチルフェニル基、メチルベンジル基を除いたメチル基	>CHCH <sub>2</sub> -	S	O	S
9	メチルフェニル基、メチルベンジル基を除いたメチル基	>CHCH <sub>2</sub> CH <sub>2</sub> -	S	O	S
10	メチルフェニル基、メチルベンジル基を除いたメチル基	>CHCH <sub>2</sub> -	O	O	S
11	メチルフェニル基、メチルベンジル基を除いたメチル基	>CHCH <sub>2</sub> -	O	O	S
12	メチルフェニル基、メチルベンジル基を除いたメチル基	>CHCH <sub>2</sub> -	S	O	O
13	メチル基	>CHCH <sub>2</sub> CH <sub>2</sub> CH <sub>2</sub> CH <sub>2</sub> - CH <sub>2</sub> CH <sub>2</sub> -	S	O	S

[0025] The thing same as a Pori epoxy compound (B) as (D11) which has two or more epoxy groups is mentioned into the molecule of this invention. It is desirable (D 11-1).

[0026] Especially if the amino compound (C) of this invention is a compound which has two or more active hydrogen originating in the amino group in a molecule, it will not be limited, but it can be suitably chosen according to an application and the purpose. It is the compound which has 2-10 active hydrogen which originates in the amino group in a molecule preferably, and is the compound which it has 3-6 pieces still more preferably. The active hydrogen equivalents (molecular weight per active hydrogen) of (C) are usually 15-500, and are 20-200 preferably. The structure of cross linkage does not become it loose that the active hydrogen equivalent is 500 or less, but physical properties, such as the adhesive property of a hardened material and endurance, are good. Physical properties, such as the adhesive property of a hardened material, endurance, and chemical resistance, are good in the active

hydrogen equivalent being 15 or more.

[0027] As an example of the amino compound of (C), the following - (C1) (C9) is mentioned, respectively.

(C1) Aliphatic series polyamine (carbon numbers 2-18, 2-7 functional groups, molecular weight 60-500);

(i) Aliphatic series polyamine {the alkylene diamine of carbon numbers 2-6 and polyalkylene (carbon numbers 2-6) polyamine [diethylenetriamine, iminobis propylamine, bis(hexamethylene) triamine, triethylenetetramine, tetraethylenepentamine, pentaethylenehexamine], etc. (ethylenediamine, propylenediamine, trimethylene diamine, a tetramethylenediamine, hexamethylenediamine, etc.)};

(ii) Such alkyls (carbon numbers 1-4) or hydroxyalkyl (carbon numbers 2-4) substitution product [a dialkyl (carbon numbers 1-3) aminopropyl amine, a trimethyl hexamethylenediamine, aminoethylethanolamine, 2, the 5-dimethyl -2, 5-hexamethylenediamine, methyliminobispropylamine], etc.;

(iii) Alicyclic or heterocycle content aliphatic series polyamine [3 and 9-bis(3-aminopropyl)-tetraoxaspiro [2, 4, 8, and 10-] [5, 5] undecane] etc.;

(iv) Ring content fatty amines (carbon numbers 8-15) (xylylene diamine, tetra-KURORU-p-xylylene diamine, etc.);

[0028] Alicyclic polyamine (carbon numbers 4-15, 2-3 functional group); (C2) 1, 3-diamino cyclohexane, isophorone diamine, a MENSENJI amine, 4, 4'-methylene JISHIKURO hexanediamine (hydrogenation methylenedianiline), etc.;

Heterocycle type polyamine (carbon numbers 4-15, 2-3 functional group): (C3) A piperazine, N-aminoethyl piperazine, 1, 4-diamino ethyl piperazine, 1, 4 bis(2-amino-2-methylpropyl) piperazine, etc.;

(C4) Aromatic series polyamine (carbon numbers 6-20, 2-3 functional groups, molecular weight 100-1000);

-- i --) -- unsubstituted -- aromatic series -- polyamine -- [ -- one -- two - one -- three - and -- one -- four - a phenylenediamine -- two -- four -- ' - and -- four -- four -- ' - diphenylmethane -- diamine -- a crew -- a blunder -- a phenylmethane -- diamine (polyphenyl polymethylene polyamine) -- diaminodiphenyl sulfone -- a benzidine -- thio -- dianiline -- a screw (3, 4-diamino phenyl) -- a sulfone -- two -- six - diamino -- a pyridine -- m - amino -- benzylamine -- a triphenylmethane color - four -- four -- ' -- four -- " -- -- triamine -- naphthylene -- diamine -- etc. etc. --;

[0029] (ii) Nuclear substitution alkyl group [methyl, ethyl, n-, and i-propyl, The aromatic series polyamine which has the carbon numbers C1, such as butyl, - C4 alkyl group, For example, 2 and 4- and 2, 6-tolylenediamine, a crew DOTORI range amine, Diethyl tolylenediamine, 4, the 4'-diamino -3, 3'-dimethyl diphenylmethane, 4, a 4'-screw (ortho toluidine), dianisidine, a diaminoditolyl sulfone, 1, the 3-dimethyl -2, 4-diaminobenzene, 1, the 3-diethyl -2, 4-diaminobenzene, 1, the 3-dimethyl -2, 6-diaminobenzene, 1, the 4-diethyl -2, 5-diaminobenzene, 1, the 4-diisopropyl -2, 5-diaminobenzene, 1, the 4-dibutyl -2, 5-diaminobenzene, 2, 4-diamino mesitylene, 1 and 3, 5-triethyl -2, 4-diaminobenzene, 1, 3, 5-triisopropyl -2, 4-diaminobenzene, the 1-methyl -3, the 5-diethyl -2, 4-diaminobenzene, The 1-methyl -3, the 5-diethyl -2, 6-diaminobenzene, 2, the 3-dimethyl -1, 4-diamino naphthalene, 2, the 6-dimethyl -1, 5-diamino naphthalene, 2, the 6-diisopropyl -1, 5-diamino naphthalene, 2, the 6-dibutyl -1, 5-diamino naphthalene, 3, 3', 5, a 5'-tetramethyl benzidine, 3, 3', 5, a 5'-tetrapod isopropyl benzidine, 3, 3', 5, 5'-tetramethyl -4 4'-diamino diphenylmethane, 3, 3', 5, 5'-tetraethyl -4, 4'-diamino diphenylmethane, 3, 3', 5, the 5'-tetrapod isopropyl -4, 4'-diamino diphenylmethane, 3, 3', 5, 5'-tetrabutyl -4, 4'-diamino diphenylmethane, 3 5-diethyl-3'-methyl -2', 4-diamino diphenylmethane, 3, 5-diisopropyl-3'-methyl -2', 4-diamino diphenylmethane, 3, the 3'-diethyl -2, 2'-diamino diphenylmethane, 4, the 4'-diamino -3, 3'-dimethyl diphenylmethane, 3, 3', 5, 5'-tetraethyl -4, a 4'-diamino benzophenone, 3, 3', 5, the 5'-tetrapod isopropyl -4, a 4'-diamino benzophenone, 3, 3', 5, 5'-tetraethyl -4, 4'-diamino diphenyl ether, 3, 3', 5, and 5' -- mixture [ of] and the various rates of these isomers, such as the - tetra-isopropyl -4 and 4'-diaminodiphenyl sulfone ];

[0030] (iii) a nuclear substitution electron withdrawing group (halogen; methoxies, such as Cl, Br, I, and

F, --) The alkoxy group of ethoxy \*\*; The aromatic series polyamine [methylenbis-o-chloroaniline which has a nitro group etc., A 4-chloro-o-phenylenediamine, 2-Krol -1, 4-phenylenediamine, A 3-amino-4-chloroaniline, 4-BUROMO -1, 3-phenylenediamine, 2, 5-dichloro - 1, 4-phenylenediamine, 5-nitro -1, 3-phenylenediamine, 3-dimethoxy-4-amino aniline; 4, the 4'-diamino -3, the 3'-dimethyl -5, 5'-dibromo-diphenylmethane, 3, 3'-dichlorobenzidine, 3, a 3'-dimethoxy benzidine, Bis(4-amino-3-chlorophenyl) oxide, a bis(4-amino-2-chlorophenyl) propane, A bis(4-amino-2-chlorophenyl) sulfone, bis(4-amino-3-methoxyphenyl) Deccan, A bis(4-aminophenyl) sulfide, bis(4-aminophenyl) telluride, Bis(4-aminophenyl) selenide, bis(4-amino-3-methoxyphenyl) disulfide, ], such as 4, 4'-methylenbis(2-iodine aniline), 4, 4'-methylenbis(2-BUROMO aniline), 4, 4'-methylenbis(2-fluoro aniline), and a 4-aminophenyl-2-chloroaniline;

[0031] (iv) Aromatic series polyamine which has the 2nd class amino group [[what a part or all of aromatic series polyamine of -NH<sub>2</sub> placed and replaced by -NH-R' (R' is low-grade alkyl groups, such as an alkyl group, for example, methyl, and ethyl)] 4, 4'-JI (methylamino) diphenylmethane, 1-methyl-2-methylamino-4-aminobenzene], etc.; [ of the above (i) - (iii) ]

Polyamide polyamine: (C5) Polyamide polyamine obtained by the condensation of dicarboxylic acid (dimer acid etc.) and superfluous polyamine (two mols or more per one mol of acids) (the above-mentioned alkylene diamine with 2-7 functional groups, polyalkylene polyamine, etc.) (number average molecular weight 200-1000);

Polyether polyamine: (C6) Hydrides of a cyanoethylation object of polyether polyol (the above-mentioned polyalkylene glycol etc.) (molecular weight 100-1000) etc.;

Epoxy addition polyamine: (C7) Epoxy addition polyamine obtained by making one mol (it being mono-epoxide (d11) to the above-mentioned poly epoxide (D11) list) of 1-30 mols of epoxy compounds add to polyamine (the above-mentioned alkylene diamine, polyalkylene polyamine, etc.) (molecular weight 100-1000);

[0032] Cyanoethylation polyamine: (C8) Cyanoethylation polyamine obtained by the addition reaction of acrylonitrile and polyamine (the above-mentioned alkylene diamine, polyalkylene polyamine, etc.) (molecular weight 100-500, such as bis-cyano ethyl diethylenetriamine);

(C9) other Pori amino-compounds: -- (i) hydrazines; (a hydrazine, monoalkyl hydrazine, etc.) -- (ii) JIHIDORAJIDDO; (succinic-acid JIHIDORAJIDDO, adipic-acid JIHIDORAJIDDO, isophthalic acid JIHIDORAJIDDO, terephthalic-acid JIHIDORAJIDDO, etc.) -- (iii) guanidine; (butyl guanidine, 1-cyanoguanidine, etc.) --; such as a (iv) dicyandiamide, -- a list -- two or more sorts of such mixture. one desirable in order to give high-speed hardenability to the adhesives of the above (C1) of - (C9), inside, and this invention -- (C1) and (C2) -- and (C3) (C5) -- it is -- especially a desirable thing is (C1).

[0033] In the adhesives of this invention, the compounding ratio of (A):(B): (C) is weight [ when setting the total quantity of (A) - (C) to 100 ] %, is 5-40:10-90:5-60 preferably, is 10-40:10-80:5-50 still more preferably, and is 15-40:10-75:5-30 especially preferably. Cold cure nature becomes good for (A) to be five or more, it has moderate working life with it being 40 or less, and workability becomes good. An adhesive property becomes good for (B) to be ten or more, the viscosity of a system becomes it small that it is 90 or less, and workability becomes good. An adhesive property becomes good for (C) to be five or more, and amine brushing is not produced as it is 60 or less.

[0034] The adhesives of this invention can be made to contain a basic compound (E) further as a hardening accelerator catalyst as occasion demands in order to promote hardenability more although the amino compound (C) is an indispensable component as a curing agent. As a basic compound (E), Lewis base compounds (E3), such as alkali compounds (E2), such as the 3rd class amino compound (E1), a sodium methylate, caustic soda, a caustic potash, and a lithium carbonate, a triethyl phosphine, and triphenyl phosphine, etc. are mentioned. A desirable thing is the 3rd class amino compound (E1) inside at these.

[0035] Although it will not be limited especially if the 3rd class amino compound (E1) desirable as the above-mentioned (E) is a compound which has the 3rd class amino group in a molecule, as an example, following (E1-1) to (E1-3) is mentioned, respectively.

Aliphatic series tertiary amine with carbon numbers 3-20 and 1-4 amino groups; A trimethylamine, (E1-

1) Triethylamine, dimethyl cyclohexylamine, dimethyl benzylamine, 1, 3-dimethyl imidazolidinone, 1, 2-dimethyl imidazole, Tetraethyl methylene diamine, the tetramethyl propane -1, 3-diamine, The tetramethyl hexane -1, 6-diamine, pentamethyl diethylenetriamine, pentamethyldipropylene triamine, tetramethyl guanidine, the bis(2-dimethylaminoethyl) ether, the ethylene glycol (3-dimethyl) aminopropyl ether, etc.;

(E1-2) Aromatic series tertiary amine; N with carbon numbers 9-20 and 1-4 amino groups, N-dimethylamino methyl phenol (common name "DMP-10"), tris (, such as N and N-dimethylamino methyl phenol (common name "DMP-30"))

A nitrogen-containing heterocyclic compound with carbon numbers 4-20 and 1-6 amino groups; 1, 8-diazabicyclo (5, 4, 0)-undecene -7 (common name "DBU"), (E1-3) 1, the 5-diazabicyclo (4, 3, 0)-nonene -5 (common name "DBN"), 6-dibutylamino -1, 8-diazabicyclo (5, 4, 0)-undecene -7 (common name "DBA-DBU"), Triethylenediamine, a hexamethylenetetramine, a dimethyl piperazine, N-methyl -N'-(2-dimethylamino)- An ethyl piperazine, N-methyl morpholine, , such as N-(N', N'-dimethylaminoethyl) morpholine, dimethylamino ethanol, dimethylamino ethoxy ethanol, N and N, and an N'- trimethylaminoethyl ethanolamine and N-methyl-N'-(2-hydroxyethyl) morpholine, is raised. [0036] Although the 3rd class amino compound (E1) should just choose a class and an addition suitably according to the cure rate and working life who are going to get, it is usually desirable that 0.1-50 weight section extent addition is carried out to the heterocycle content (compound A) 100 weight section.

[0037] As an adhesive improver which can be used in order to raise the adhesive property of the adhesives of this invention further, a silane coupling agent, a titanium coupling agent, an aluminum coupling agent, etc. are raised, for example. As such a silane coupling agent, vinyl alkyl (carbon numbers 1-4) alkoxy (carbon numbers 1-4) silane [, for example, vinyltrimetoxysilane, ], AKURIRO (meta) yloxy alkyl (carbon numbers 1-4) silanes [for example, gamma-methacryloxypropyl trimethoxy silane] etc., such as vinyltriethoxysilane, Alkyl (carbon numbers 1-4) alkoxy (carbon numbers 1-4) silane [, for example, methyl trimetoxysilane, ] and amino (they are 1-4 pieces in molecule) alkyl (carbon numbers 2-15) alkoxy (carbon numbers 1-4) silanes [, for example, gamma-(2-aminoethyl) aminopropyl trimethoxysilane, [, such as methyl triethoxysilane, ] ], such as aminopropyl trimethoxysilane and N-phenylamino propylmethyl dimethoxysilane, Epoxy (they are 1-4 pieces in molecule) alkyl (carbon numbers 1-4) alkoxy (carbon numbers 1-4) silane [, for example, gamma-glycidoxypropyltrimetoxysilane, ], mercapto (they are 1-4 pieces in molecule) alkyl (carbon numbers 1-4) alkoxy (carbon numbers 1-4) silanes [for example, gamma-mercaptopropyltrimethoxysilane] etc., etc., such as gamma-glycidoxy propyltriethoxysilane, are raised. As a titanium coupling agent, Ti (O-C17H35)4, Ti(O-i-C3H7)2[OC(CH3) HCOCH3]2Ti(O-n-C4H9)2[OC2H4N(C2H4OH)2]2, titanium-i-propoxy octylene glycolate, i-propoxytitanium tree i-stearate, a titanium (ethylene GURIKORATO) screw (dioctyl phosphate), etc. are raised. TORIBUTOKISHI aluminum, tris TEAROKISHI aluminum, etc. are raised as an aluminum coupling agent. Even if it uses them, using together two or more sorts of these coupling agents, they do not interfere. Moreover, although any coupling agent can be used, it is dealt with and a silane coupling agent is desirable from a cost side. Among these, it is vinyl alkyl alkoxysilane, AKURIRO (meta) yloxy alkyl alkoxysilane, amino alkyl alkoxysilane, and epoxy alkyl alkoxysilane preferably, and they are vinyltrimetoxysilane, gamma-methacryloxypropyl trimethoxy silane, gamma-(2-aminoethyl) aminopropyl trimethoxysilane, and gamma-glycidoxypropyltrimetoxysilane especially preferably.

[0038] the business of this invention -- adhesives -- the need -- responding -- (1) hindered amine and hydroquinone -- Anti-oxidants, such as hindered phenols and a sulfur content compound, and (2) benzophenones Ultraviolet ray absorbents, such as benzotriazols, salicylate, and metallic complexes, (3) Inorganic and organic salt of metal soap and heavy metal (for example, zinc, tin, lead, cadmium, etc.), Stabilizers, such as an organic tin compound, (4) phthalic ester, phosphoric ester, Plasticizers, such as fatty acid ester, epoxidized soybean oil, castor oil, and liquid paraffin alkyl polycyclic aromatic hydrocarbon, (5) Paraffin wax, a micro crystallin wax, a polymerization wax, Waxes, such as a dense low, spermaceti wax, and low-molecular-weight polyolefine, (6) benzyl alcohol, Nonresponsive

diluents, such as tar and PICHUMEN, (7) low-molecular aliphatic series glycidyl ether, Reactant diluents, such as aromatic series monoglycidyl ether, (8) calcium carbonates, A kaolin, talc, a mica, a bentonite, clay, a sericite, asbestos, Glass fiber powder, carbon fiber powder, aramid fiber powder, nylon fiber powder, acrylic-fiber powder, Glass balun, milt balun, coal dust, acrylic resin powder, phenol resin powder, Bulking agents, such as metal powder, ceramic powder, a zeolite, and slate powder, (9) activated carbon, Deodorant (10) carbon black, such as a zeolite, a silica sol, and silica gel, A pigment or colors, such as titanium oxide, a red iron oxide, a minium, Para Red, and Berlin blue, (11) Solvents, such as ethyl acetate, toluene, alcohols, ether, and ketones, (12) A foaming agent, (13) defoaming agents, (14) dehydrating agents, (15) antistatic agents, (16) antimicrobial agents, (17) antifungal agents, (18) viscosity controlling agents, (19) perfume, (20) flame retarders, etc. can be added.

[0039] The adhesives of this invention are the adhesives of a reaction type, first, the hardening device reacts with (A), (C) carries out ring breakage, a sulfhydryl group is generated, and the sulfhydryl group reacts with (B). In this case, (C of the reaction rate with (B)) is larger [ the sulfhydryl group ] than (C), although (B) reacts. Therefore, as storage and the use gestalt of each component of the adhesives for old and new concreting splices of this invention, the following (i) or (ii) is illustrated.

(i) A heterocycle content compound (A), an epoxy group content compound (B), and the amino compound (C) are saved in the form of 3 liquid where it became independent, and three components are mixed and stiffened at the time of use. As the 4th component, the basic compound (E) which is an arbitration component can be saved independently, and can also be saved in the form which mixing with other components and using at the time of use also added in (A) and/or (C).

(ii) It saves in the form of 2 liquid where the amino compound (C) became independent in the mixture of a heterocycle content compound (A) and an epoxy group content compound (B), and a list, and these two components are mixed and stiffened at the time of use. As the 3rd component, the basic compound (E) which is an arbitration component can be saved independently, and can also be saved in the form which mixing with other components and using at the time of use also added in (C).

[0040] The adhesives of this invention can mix the compound of (A), (B), (C), and others using the usual mixers, such as an omnipotent mixer. (C) is usually blended at the time of use. From paint film workability, hardenability, and an adhesive point, the viscosity in 25 degrees C is desirable, and these adhesives are 2.5 - 4 Pa-s, and are 5 - 7 Pa-s preferably in 0 degree C. Even if cold cure is possible for these adhesives and they are under the low-temperature environments following 5 degrees C, they can be hardened enough. The hardened material is excellent in physical properties, such as an adhesive property, endurance, and chemical resistance.

[0041] About construction-joint \*\*\*\*\* actuation of the old and new concrete which used the adhesives of this invention, it can carry out according to a conventional method. new concrete is placed, before it uses and applies a brush, a roller, etc. and adhesives specifically harden these adhesives for \*\*\*\* splices next except for the dust and dust which were attached to the front face of the old concrete side -- it is -- it is -- it is the approach of slushing. Moreover, from the hardening gestalt of the adhesives of this invention, as for the paint film thickness of adhesives, it is desirable that it is 5mm or less, and it can apply it in piles in one - several steps. Since this invention strikes and the adhesives for splices are excellent in the adhesive property with concrete, old and new concrete strikes the application, and it is not limited to a splice, but is applicable to anchor bolt embedding, crack impregnation repair of concrete, float repair of concrete, the protective coating of a concrete floor, adhesion of a tile, etc. at an effective target.

[0042]

[Example] Hereafter, although an example explains this invention concretely, this invention is not limited to these examples. The section in an example and the example of a comparison expresses the mass section.

[0043] Moreover, the test method of the evaluation criteria in an example is as follows.

[Chemical resistance]; it is JIS about the adhesives for old and new concreting splices of this invention. It is JIS about the paint film surface chemical resistance stiffened under 0 degree C and 25 degrees C after using and applying a 0.1mm film applicator to the steel plate defined by A5400. It carried out

according to A5400. In addition, that from which O produced that changeless, it faded and \*\*, bulging, and peeling produced what was carried out was made into x.

Under [mixed viscosity]; 0 degree C and 25 degrees C, the adhesives for old and new concreting splices of this invention blended by the presentation of Tables 2 and 3 were stirred, and it measured with BL mold rotational viscometer after 2 minutes. (Unit; mPa-s)

After painting the adhesives for old and new concreting splices of this invention blended with the front face of the 30x30x5cm PC board for foot walks by the presentation of Tables 2 and 3 with the wool yarn roller B-23 1.5mm in thickness and carrying out care-of-health hardening for seven days under [bond strength]; 0 degree C and 25 degrees C, it measured by the BRI style adhesive strength test method.

(Unit; Kgf/cm<sup>2</sup>)

[0044] After the 2-ethylhexyl glycidyl ether of the 58 sections was dropped having taught the carbon-disulfide 90 section, the lithium bromide 5 section, and the tetrahydrofuran (THF) 120 section to the example of manufacture 1 reaction container, having carried out the stirring dissolution, and keeping the inside of a reaction container at 20 degrees C or less, it riped at 40 degrees C for 5 hours. After distilling off THF and a superfluous carbon disulfide under reduced pressure, it filtered and the heterocycle compound (A-1) of the light yellow liquid of 25-degree C viscosity 40 mPa-s and the heterocycle radical equivalent 262 was obtained.

After the trimethylolpropane triglycidyl ether (weight per epoxy equivalent 140) of the 140 sections was dropped keeping the inside of a reaction container at 20 degrees C or less after teaching the carbon-disulfide 90 section, the lithium-chloride 5 section, and the THF140 section to the example of manufacture 2 reaction container and carrying out the stirring dissolution, it riped at 40 degrees C for 5 hours. After distilling off THF and a superfluous carbon disulfide under reduced pressure, it filtered and the heterocycle compound (A-2) of the light yellow liquid of 25-degree C viscosity 130 mPa-s and the heterocycle radical equivalent 218 was obtained.

[0045] After the trimethylene oxide of the 58 sections was dropped keeping the inside of a reaction container at 20 degrees C or less after teaching the carbon-disulfide 90 section, the lithium bromide 5 section, and the THF120 section to the example of manufacture 3 reaction container and carrying out the stirring dissolution, it riped at 40 degrees C for 5 hours. Under reduced pressure, after distilling off THF and a superfluous carbon disulfide, it filtered and the heterocycle compound (A-3) of the fine yellow liquid of 25-degree C viscosity 40 mPa-s and the heterocycle radical equivalent 140 was obtained.

[0046] Each component was mixed and stirred with the loadings shown in one to examples 1-5 and example of comparison 3 tables 2 and 3, and the performance evaluation test as adhesives for old and new concreting splices was performed with the aforementioned test method. The following were used as poly epoxide (B).

Poly epoxide (B-1); as an amino compound (C) which has two or more active hydrogen originating in the amino group, the following were used into the Epicoat 828 (oil-ized shell epoxy company make; bisphenol A diglycidyl ether, weight-per-epoxy-equivalent 190, viscosity 11 Pa-s) molecule.

aliphatic series polyamine (C-1); -- meta-xylylene diamine (the active hydrogen equivalent 36, viscosity 7 mPa-s) -- the following were used as a hardening accelerator again.

it is a DMP-30(E-2); tris (N and N-dimethyl aminomethyl) phenol -- "KAPUKYUA 3-800" (active hydrogen equivalent 280, viscosity 1.8 Pa-s) by Henkel KGaA in Table 2 and 3 is a polymercaptan compound. Moreover, Ketimine M was compounded by carrying out dehydration of the methyl isobutyl ketone to polyoxy propylenediamine. An evaluation result [ in / for the evaluation result in 0 degree C of the above-mentioned examples 1-5 and the examples 1-5 of a comparison / 25 degrees C ] is shown in Table 2 in Table 3.

[0047]

[Table 2]

	実施例					比較例				
	1	2	3	4	5	1	2	3	4	5
ヘテロ環化合物	A-1									
	A-2	40	30	30						
	A-3				30					
ケチミンM						152				
メタクリル酸(C-1)	35	37	35	37	37		34	34	280	140
カブキユア3-800										
フェノール								1.7		
DMP-30(E-2)			2				2	2	5	5
エピコート828(B-1)	180	180	180	180	180	180	180	180	180	180
耐薬品性	○	○	○	○	○	×	×	×	△	△
10%硫酸	○	○	○	○	○	×	×	×	△	△
10%NaOH	○	○	○	○	○	×	×	×	△	△
水	○	○	○	○	○	△	△	△	×	×
混合粘度 (mPa·s)	6400	5000	6200	7000	5800	3000	9800	9400	15000	13000
接着力 (kgf/cm <sup>2</sup> )	25	25	25	25	25	3	5	10	25	25
	(材破)	(材破)	(材破)	(材破)	(材破)	(界面剥離)	(界面剥離)	(界面剥離)	(材破)	(材破)

配合量 (部)

[0048]

[Table 3]

	実施例					比較例				
	1	2	3	4	5	1	2	3	4	5
ヘテロ環化合物	30	40	30							
A-1										
A-2				30						
A-3					30					
ケチミンM						152				
メチルメタクリレート(C-1)	35	37	35	37	37		34	34	280	140
カプキユア3-800										
フェノール							1.7			
DMP-30(C-2)			2				2	2	5	5
エポコート828(B-1)	180	180	180	190	190	190	190	190	180	180
耐薬品性	○	○	○	○	○	△	△	△	○	○
10%硫酸	○	○	○	○	○	△	△	△	○	○
10%NaOH	○	○	○	○	○	△	△	△	○	○
水	○	○	○	○	○	○	○	○	△	△
混合粘度 (mPa·s)	3500	2800	3600	4000	3500	2000	6200	6000	23000	20000
接着強度 (kgf/cm <sup>2</sup> )	25	25	25	25	25	2	5	10	25	25
	(材破)	(材破)	(材破)	(材破)	(材破)	(界面剥離)	(界面剥離)	(界面剥離)	(材破)	(材破)

配合量 (部)

[0049]

[Effect of the Invention] The adhesives for old and new concreting splices of this invention have hardenability also at (1) ordinary temperature thru/or low temperature like 5 degrees C.

(2) It is hypoviscosity, and it has moderate working life and excel in workability.

(3) Excel in an adhesive property and excel in hardened material nature, such as a chemical-proof. For this reason, concrete is begun and it is very useful as adhesives for \*\*\*\*\*, such as glass, a metal, and wood. The effectiveness of \*\* is done so.

(4) Since an organic solvent is not used, it is suitable for two coats, and reduction of the problem of safeties, such as air pollution, can be aimed at.

[Translation done.]



## \* NOTICES \*

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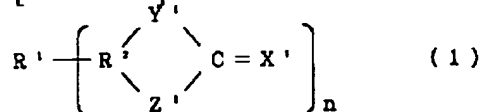
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## CLAIMS

[Claim(s)]

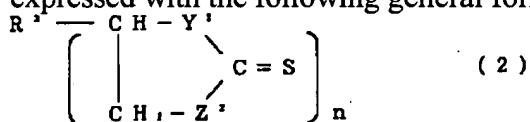
[Claim 1] Adhesives for old and new concreting splices characterized by consisting of the heterocycle content compound (A) expressed with the following general formula (1), a Pori epoxy compound (B) which contains two or more epoxy groups in a molecule, and an amino compound (C) which has two or more active hydrogen which originates in the amino group in a molecule at a list.

[Formula 1]

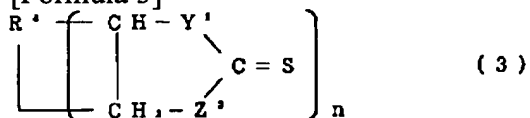


[-- for n, as for oxygen or sulfur atom; R<sup>1</sup>, the integer of 1-10, and X<sup>1</sup>, Y<sup>1</sup> and Z<sup>1</sup> are [ the residue of a cyclic ether radical content compound (D) or hydrogen atom; R<sup>2</sup> ] the hydrocarbon group of carbon numbers 2-10 independently among a formula (1), respectively.]

[Claim 2] Adhesives according to claim 1 whose \*\* (A) is the heterocycle content compound (A1) expressed with the following general formula (2) or (3). General formula [\*\* 2]



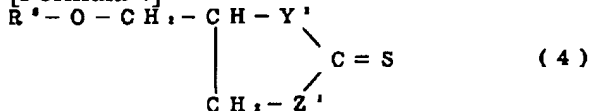
[Formula 3]



As for O; R<sup>3</sup>, the integer of 1-10 and one side of Y<sup>2</sup> and Z<sup>2</sup> is [ another side of n ] the residue of poly epoxide (D11) or mono-epoxide (d11) in S among [type (2)]. R<sup>4</sup> is the residue of alicyclic epoxide among a formula (3).]

[Claim 3] Adhesives according to claim 1 or 2 this whose compound (A1) is a heterocycle content compound (A2) expressed with the following general formula (4).

[Formula 4]



It is the residue excluding [ one side / of Y<sup>2</sup> and Z<sup>2</sup> / O; R<sup>5</sup> ] the glycidyl group of monoglycidyl ether (d11-2) in another side at S among [type (4)].

[Claim 4] Claims 1-3 whose \*\* (C) are aliphatic series Pori amino compounds are the adhesives of a publication either.

[Claim 5] Furthermore, they are the adhesives of a publication either to claims 1-4 which come to blend with this adhesives constituent a hardening accelerator catalyst, an adhesive improver, a dehydrating agent, a bulking agent, a plasticizer, an antioxidant, a pigment, a reactant diluent, and one or more sorts of additives chosen from the group which consists of a solvent.

[Claim 6] Adhesives according to claim 5 this whose additive is an adhesive improver.

[Claim 7] Adhesives according to claim 6 this whose adhesive improver is a silane coupling agent.

[Claim 8] Claims 1-7 are the hardened materials which make it come to harden the adhesives of a publication either.

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[Translation done.]